

JP 05-239558

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-239558

(43)Date of publication of application : 17.09.1993

(51)Int.Cl. C21D 9/56

F27B 9/04

F27B 9/16

F27B 9/40

F27D 7/06

(21)Application number : 04-078626

(71)Applicant : KAWASAKI STEEL CORP

(22)Date of filing : 28.02.1992

(72)Inventor : UEDA OSAMU
YOSHIDA SHIGERU
KIMURA MITSUZO

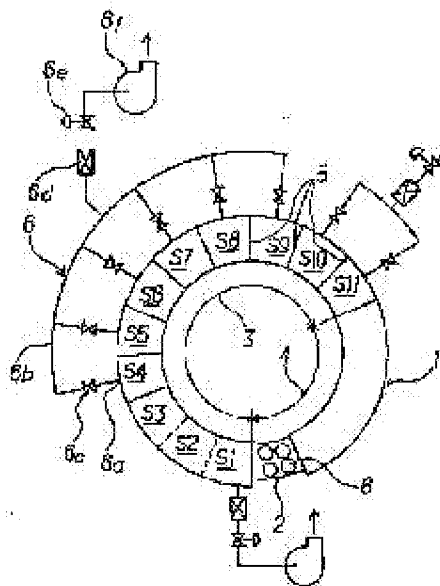
(54) TRAVELING FURNACE HEARTH TYPE CONTINUOUS HEAT TREATMENT APPARATUS

(57)Abstract:

PURPOSE: To continuously change plural heat patterns in good controllability by arranging a parting door in each of parts between sections in a shifting furnace hearth and controlling the furnace temp. and the atmosphere in the each section.

CONSTITUTION: In the traveling furnace hearth 2, parting doors 5 for dividing the furnace are arranged as the furnace length units having integral times that of a section unit treating a charging/ejecting lot of materials to be heat-treated as one unit, and in each of parts between the sections, convection and radiation heat are shut off. Further, an gas exhaust device 6 for exhausting the gas generated by directly firing a gas fuel to the each section unit is arranged so as to be possible to execute the settings of plural heat patterns by executing the furnace temp. setting independently in the section unit. By

closing the connecting line in each of the parts between the sections in the shifting furnace hearth 2 at the lower end of the parting door 5, sealing near the parting door 5 is executed.



CLAIMS

[Claim(s)]

[Claim 1] A movable-furnace floor type continuous-heat-treatment device which provides a partition door which classifies a furnace per length of chamber of an integral multiple of this division unit by making into a division unit movable-furnace floor length which is a movable-furnace floor type continuous heat treating furnace, and makes one unit insertion/extraction lot of elegance to be heat-treated, and can control coke oven temperature and atmosphere for every divided division of this.

[Claim 2] A movable-furnace floor type continuous-heat-treatment device divides a joint line between each division of a movable-furnace floor, and it was made to close with a lower end of a door in claim 1.

[Claim 3] A slot is provided so that may divide joint thermal insulation of each hearth as integrated structure, it may divide into the door lower part in claim 1, it may insert in with a door and **** may be made, A movable-furnace floor type continuous-heat-treatment device with which each division was sealed in the state where it divides also into a furnace side attachment wall, and divides with a holder part which a slot was provided so that it might insert in with a door and **** might be made, a section of the length direction provided eaves for sealing of T shape in an upper bed of a partition door, and was provided in a furnace crown, and a door is getting down.

[Claim 4] In claim 1, provide a door casing in the upper part of a partition door, and a slot is provided so that may divide joint thermal insulation of each hearth as integrated structure, it may divide into the door lower part, it may insert in with a door and **** may be made, A movable-furnace floor type continuous-heat-treatment device with which provides a slot so that it may divide also into a furnace side attachment wall, it may insert in with a door and **** may be made, and each division was always sealed.

[Claim 5] A movable-furnace floor type continuous-heat-treatment device which consists of two or more divisions which used a heat source which does not generate exhaust gas in furnaces, such as an electrical heater, in claim 1.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to continuous-heat-treatment devices, such as a metal strip coil.

[0002]

[Description of the Prior Art] In order to anneal a steel sheet coil etc. for a long time, there is a box furnace as a furnace annealed in batch, but since the rate of productivity is bad, a move hearth type furnace is the main force now. For example, since a heat pattern changes with steel types when annealing a grain-oriented magnetic steel sheet, it is necessary to have an annealing furnace for each heat pattern. Although it is obliged to use of the box furnace in which the productivity which annealing at a move hearth type furnace is uneconomical, and was described above for the reason explained below about a steel type with little quantity of production is inferior, the steel type with much quantity

of production uses a continuous furnace, i.e., a move hearth type furnace. The annealing technique of the coil by a movable-furnace floor type heating furnace being known widely, laying the steel sheet coil which equipped with the inner cover the movable-furnace above the floor level which rotates superficially, and supplying controlled atmospheres, such as H_2 , in an inner cover. One by one, an intermittent transfer is carried out every 1 pitch, the inside of the rotary furnace which comprises *****, a soaking zone, and a cooling zone is passed, and it anneals continuously through a predetermined thermo cycle.

[0003]Therefore, a move hearth type furnace performs two or more division distribution which needs to lengthen a length of chamber in order to raise productivity, for example, is called heating-zone 10 division and soaking zone 3 division. Therefore, as long as it anneals continuously, in order to be influenced by the coke oven temperature of an adjoining division, only one heat pattern can be set up but it will be restricted to annealing of a specific steel type. When processing an unavoidably different heat pattern, in order not to influence a backward coil (precedence coil) by the coke oven temperature of a precedence coil (backward coil), after a precedence coil comes out of heating and a soaking zone and changing coke-oven-temperature setting out, there is the method of inserting in a backward coil and annealing, but. In order to once make heating and a soaking zone into ****, there is a problem to which the rate of productivity falls.

[0004]It is necessary increasingly to control precisely the heat pattern in the case of heat treatment of a coil etc. as the demand of upgrading of a product increases in recent years. Although the method of providing the separator which intercepts circulation of atmosphere between a soaking zone and a cooling zone, the method of providing an independently controllable heat source in JP,60-67628,A for every zone further, etc. are indicated as a method for that at JP,57-76122,A, In the former, a zone is too large, and since interception between zones is not perfect, neither can control the heat pattern of the coil itself by sufficient accuracy at the latter. Although the method of dividing each zone still more finely was indicated by JP,60-177953,U, since circulation of atmosphere was only intercepted, there was a problem that sufficient control was not expectable.

[0005]

[Problem(s) to be Solved by the Invention]This invention provides the art which controllability is good and enables change of a heat pattern continuously also in a movable-furnace floor type continuous-heat-treatment device.

[0006]

[Means for Solving the Problem]By forming the exhaust which exhausts the exhaust gas emitted with a partition door which covers a convection and radiant heat, a gas **** open flame, etc. per division between each division of a heating zone and a soaking zone, in order that this invention may solve this problem, Coke-oven-temperature setting out is independently enabled per division, and it can be made to perform setting out of two or more heat patterns. Namely, this invention makes a division unit movable-furnace floor length which is ** movable-furnace floor type continuous heat treating furnace, and makes one unit insertion/extraction lot of elegance to be heat-treated, and is a length-of-chamber unit of an integral multiple of this division unit, In [provide a partition door which classifies a furnace, are this divided movable-furnace floor type continuous-heat-treatment device that can control coke oven temperature and atmosphere for every division, and] ****, In [are the movable-furnace floor type continuous-heat-treatment

device divides a joint line between each division of a movable-furnace floor, and it was made to close with a lower end of a door, and] ****, A slot is provided so that joint thermal insulation of each hearth may be divided as integrated structure, it may insert in the door lower part with a bridgewall and **** may be made, Provide a slot so that it may divide also into a furnace side attachment wall, it may insert in with a door and **** may be made, and a section of the length direction provides eaves for sealing of T shape in an upper bed of a partition door, In [are the movable-furnace floor type continuous-heat-treatment device with which each division was sealed in the state where it divides and a door is getting down with a holder part of a furnace crown, and] ****, Provide a door casing in the upper part of a partition door, and a slot is provided so that may divide joint thermal insulation of each hearth as integrated structure, it may divide into the door lower part, it may insert in with a door and **** may be made, In [are the movable-furnace floor type continuous-heat-treatment device with which provides a slot so that it may divide also into a furnace side attachment wall, it may insert in with a door and **** may be made, and each division was always sealed, and] ****, It is a movable-furnace floor type continuous-heat-treatment device which consists of two or more divisions which used a heat source which does not generate exhaust gas into furnaces, such as an electrical heater.

[0007]

[Function]Without according to this invention, receiving the influence of the coke oven temperature of the division which adjoins each division unit, since it divides into each division of heating and a soaking zone and a door and the exhaust are formed, it becomes possible to set up coke oven temperature independently, and setting out of two or more heat patterns is attained. The top view and sectional view of a moving bed type continuous-heat-treatment device concerning this invention are shown in drawing 1 and drawing 2. In drawing 1, a cooling zone region and 5 divide heating with which 1 consists of ****, a movable-furnace floor (a rotary furnace floor is called below) of a rotating type [2], and a division of plurality [3], a soaking zone region, and 4, and a door and 6 are the exhausts. Even if S1 - S3 division where coil temperature is low changes a steel type, the heat pattern is common, and since it is unnecessary, it is not necessary to provide a partition door. The exhaust 6 is considered as three exhaust air, a low temperature region, a moderate temperature region, and a pyrosphere, and is manufactured in consideration of the controllability of furnace pressure, and the heat resistance of equipment. As for a damper and 6 d, 6b is [an exhaust duct and 6c / a furnace pressure regulating valve and 6 f of a heat exchanger and 6e] fans. In drawing 2, a coil and 8 are [a rotary furnace floor and 2a of a burner and 6a] rotary furnace floor backup rolls an exhaust port and 2 an inner case and 9 7.

[0008]The following method was proposed about the ceiling near a partition door.

- 1) When not using integrated structure for the joint of each division of a movable-furnace floor, the method which divides this joint and is closed with the lower end of a door as shown in drawing 3 can perform simple.
- 2) Form the slots 5f and 5e which insert in the side attachment wall and hearth which divide with the case where integrated structure is used for the joint of each division of a movable-furnace floor as shown in drawing 4, and touch a door by it with a bridgewall, and serve as doubling. For this reason, a seal degree surpasses the case of 1.
- 3) Consider it as the structure sealed when carry out the seal of the furnace crown simple

in 2, divide as shown in drawing 5, and the length direction section provides the eaves of T shape on a door, the holder part 5g which consists of ceramic fiber etc. is formed in the furnace crown and a partition door is taken down. In this case, the seal at the time of raising the partition door falls. This method is good to use, when it can manufacture cheaply compared with the method in which the next carries out a seal more nearly thoroughly and temperature control does not take accuracy so much comparatively like a low-temperature heating zone.

4) Divide in 3, and as shown in drawing 4, form the door casing 5b in the ceiling corresponding to a door, and carry out the seal of the division to it more nearly thoroughly. A seal degree can be raised by adjusting opening length l and the aperture width w by the drop arch shown in drawing 4. This method is good to use for the soaking zone etc. which need to control temperature precisely.

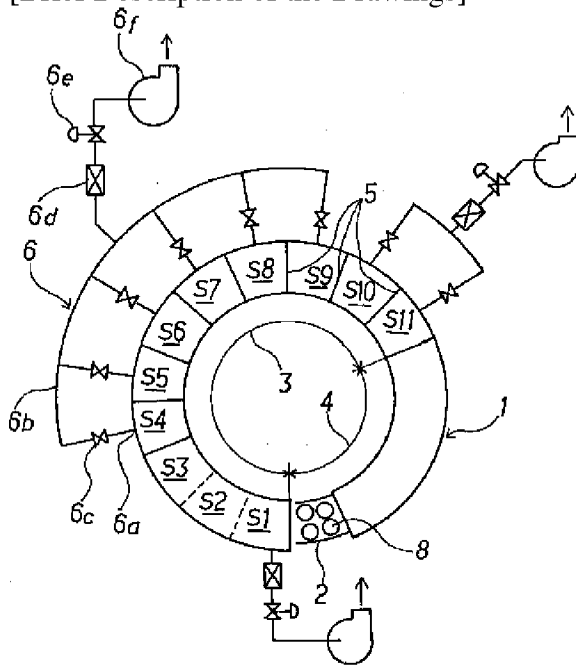
[0009]The setting method of the coke oven temperature in the movable-furnace floor type thermal treatment equipment manufactured according to this invention and change of the coil temperature corresponding to it are shown in drawing 7. It is shown that drawing 7 (a) can perform two or more coke-oven-temperature setting out, such as a, b, and c, in the graph which develops a horizontal axis to a division and carries out vertical-axis coke-oven-temperature setting out. Drawing 7 (b) shows the coil temperature corresponding to coke-oven-temperature setting out, i.e., heat treatment diagram a', and b'c'. By applying the above methods in a movable-furnace floor type thermal treatment equipment, it is easy to change a heat pattern for every division, and change does not take time, either, but it can carry out continuously, and the controllability of temperature and atmosphere is very good. Now, in the above movable-furnace floor type thermal treatment equipments, if a heat source is made into gas, complicated piping structure as shown in drawing 1 is needed, but if a heat source is made into the electrical and electric equipment, this problem will be reduced substantially. In a detailed description of the invention, although annealing of the steel sheet coil was mainly explained, elegance to be heat-treated is not limited to a steel sheet coil.

[0010]

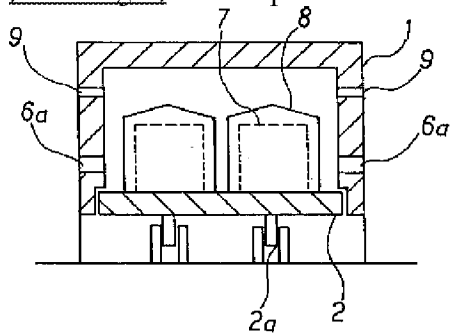
[Effect of the Invention]In heating and a soaking zone, since this invention enabled coke-oven-temperature setting out independently for every division, it can change now two or more heat patterns continuously, and can respond to production flexibly.

DESCRIPTION OF DRAWINGS

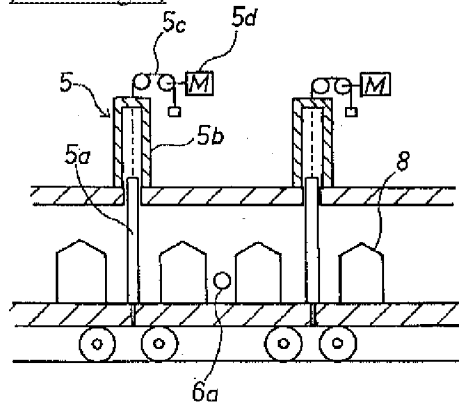
[Brief Description of the Drawings]



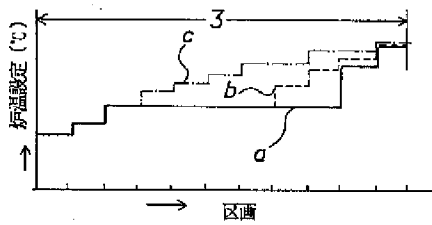
[Drawing 1] It is a top view of the example of this invention.



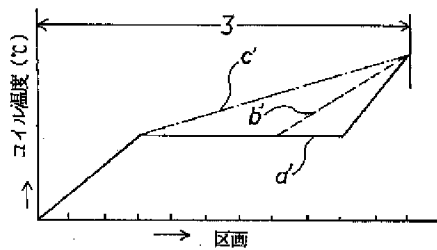
[Drawing 2] It is a cross-sectional view of drawing 1.



[Drawing 6] It is a sectional view showing the partition door of this invention, and the slot of a furnace side attachment wall.
(a)



(b)



[Drawing 7] It is a graph which shows the relation between each belt division of this invention example, coke-oven-temperature setting out, and coil temperature.

[Description of Notations]

1 ****

1a furnace crown

1b furnace side attachment wall

1c drop arch

2 Movable-furnace floor

2a movable-furnace floor backup roll

3 Heating, a soaking zone region

4 Cooling zone region

5 Partition door

5a partition door body

5b partition door casing

5c partition door hoisting device

5d partition door drive motor

The slot established in 5e hearth

The slot established in the 5f furnace side attachment wall

The holder part provided in a 5g furnace crown

6 Exhaust

6a exhaust port

6b exhaust duct

6c damper

6d heat exchanger

6e furnace pressure control valve

6f fan

7 Coil

8 Inner case

9 Burner

l Opening length by a drop arch

w Aperture width by a drop arch